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LAW OFFICE OF BARRY R LIPSITZ
755 MAIN STREET
MONROE, CT 06468

EXAMINER	
LAROSE, COLIN M	

ART UNIT	PAPER NUMBER
2623	6

DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/821,104	KEENEY ET AL.	
	Examiner	Art Unit	
	Colin M. LaRose	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 August 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20,22-51 and 53-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20,22-51 and 53-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Arguments and Amendments

1. Applicants' amendments and/or arguments filed 28 August 2003 (Paper 5), have been entered and made of record.

Response to Amendments and Arguments

2. Applicant's arguments in Paper 5 concerning the following claims have been fully considered but they are not persuasive for at least the following reasons.

Regarding claims 1, 32, 63, and 64, Applicant argues (p. 18-19) that Garland does not teach that the image is encoded into a single compressed copy of the image. Rather, as Applicant points out, Garland utilizes hierarchical encoding that produces several encoded frames.

Although Garland does hierarchically decompose the image, Garland does not create multiple copies of the compressed image. Garland's differential and reference frames are merely components of the encoded image. That is, the encoded image consists of the reference frame and the differential frames. The combination of those frames produces a single compressed copy of the image.

Also regarding claims 1, 32, 63, and 64, Applicant argues (p. 18) that Garland uses a "special" decoder rather than a "standard" decoder, as claimed. It is not apparent what the difference between "standard" and "special" decoders is. Therefore, "standard" shall be interpreted merely as "known". One can argue that all decoders are "special" since all decoders

decode a certain (i.e. "special") type of encoded image. Or it can be said that all decoders are "standard" in that all existing decoders are commonly known to those skilled in the art.

Regarding claim 4, 5, 35, 36, 63, and 64, Applicant argues (p. 18-19) that Garland does not disclose identifying areas of interest in each digital image in a sequence of related digital images. However, Garland clearly discloses that his encoding system applies to MPEG encoding, wherein "a group of images is organized in a sequence" (column 9, lines 17-18).

Regarding claims 20 and 51, Applicant argues (p. 20-21) that Garland does not disclose encoding and transmitting the areas of interest in one or more data streams separate from the unidentified areas of interest, as claimed. However, Garland discloses encoding the unidentified areas into a first data stream (the reference frame) and the identified areas of interest into one or more data streams (the differential frames). [Here, "data stream" essentially denotes a portion of the encoded image that is to be transmitted/decoded as one group.] Then, the data streams are separately sent, or transmitted, to a decoder, which decodes the different streams in sequence. Column 8, lines 60-67: the reference frame is received and decoded first, and then the differential frames are successively received and decoded.

Garland does not expressly state that the frames are "transmitted" to the decoder. However, it is understood that the encoded frames must somehow be moved (transmitted) from the encoder to the decoder. Whether the encoder and decoder are in the same physical location (i.e. in the same computer) is irrelevant.

Regarding claims 63 and 64, Applicant argues (p. 22) that these claims specify identified areas of interest rather than anticipated areas of interest, as taught by Stark. Examiner submits that "anticipated" and "identified" areas are not mutually exclusive. Stark's areas may or may not be anticipated, but they are certainly identified. The areas would not be able to be processed if they weren't first identified, or otherwise designated in some way.

Applicant argues (p. 22) that Stark "makes no mention of image compression where the identified areas of interest are encoded at a first quality level and the unidentified areas are encoded at a second and lower quality level" and that Stark discloses only "still images". However, Stark was relied upon only for the teaching of how to identify the areas of interest. Garland teaches encoding the areas at different quality levels and encoding image sequences.

Regarding claims 30 and 61, Applicant argues (p. 22-23) that Garland does not disclose "artificially creating additional areas of interest", as claimed.

The word "artificially" does not substantially change the scope of the claim. Digital images are not naturally occurring phenomena. They are artificial; and creating areas of interest in digital images is inherently an "artificial" process.

Also, Garland does disclose creating "additional" areas of interest. The user is free to identify any arbitrary number of areas of interest. So, after a first area is identified, additional areas may also be identified.

Applicant argues that claims 31 and 62 are patentable over Garland because Garland does not disclose or suggest designating product or product names as enhanced areas of interest, as

claimed. As recited previously, Garland's areas of interest are specified by the system's user(s), and depend on the arbitrary decisions of the user(s). Also, these claims merely recite an intended use of the claimed system, which alone is an unpatentable limitation. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. Garland's system is capable of performing the intended use, so it meets the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1-4, 7, 12, 13, 15, 16, 20, 22, 26, 28, 30, 32-35, 38, 43, 44, 46, 47, 51, 53, 57, 59, and 61 are rejected under 35 U.S.C. 102(a) as being anticipated by U.S. Patent 6,144,772 by Garland et al. ("Garland").

Regarding claims 1 and 32, Garland discloses a method/system of digital image compression, comprising:

display (118, figure 1);

identifying a plurality of areas of interest in the digital image (e.g. regions 912, 914, and 916, figure 9);

encoding the identified areas of interest at a first quality level (column 2, lines 38-39 and column 7, lines 4-8: a quality level is assigned to each of the image regions, which are

subsequently encoded at said level) and unidentified areas of the image (i.e. background area 910, figure 9) at a second and lower quality level than the identified areas (column 2, lines 39-43: lower quality level is assigned to the background, which is subsequently encoded at said lower level) in order to produce a single compressed copy of the image which can be decoded at a standard decoder.

Regarding claims 2 and 33, Garland discloses creating a quantization map based on the identified areas of interest (column 7, lines 26-36 and 48-51: each region is assigned a compression factor C_n, which represents the quantization scale α. Thus, Garland creates a quantization map, which denotes the quantization for each region of the image).

Regarding claims 3 and 34, Garland's system applies to single still frame (i.e. a single image).

Regarding claims 4 and 35, Garland's system applies to image sequences (column 9, lines 13-23).

Regarding claims 7 and 38, Garland discloses identifying areas using a mouse (column 2, lines 11-15).

Regarding claims 12 and 43, an image is inherently a spatial representation of itself.

Regarding claims 13 and 44, Garland discloses assigning values to each area of interest based on the amount of interest in that area (i.e. the importance of each area), first values being assigned to areas with higher interest and second values being assigned to areas of lower interest (column 6, line 66 through column 7, line 8: areas are assigned numbers based on importance); and

encoding each area of interest at a quality level corresponding to the assigned value, said areas with said first values being encoded at higher quality levels then said areas with said second values (figure 9 and column 8, lines 35-38: encoding is carried out for each region on the basis of the quality levels of each region, in order of increasing quality levels).

Regarding claims 15 and 46, Garland's encoding uses DCT blocks (column 2, lines 25-30).

Regarding claims 16 and 47, Garland discloses adjusting the quality level using quantization scale factors as claimed (column 7, lines 26-35).

Regarding claims 20 and 51, Garland discloses a method/system of digital image compression comprising steps/means for:

displaying an image (118, figure 1)

identifying a plurality of areas of interest in the digital image (e.g. regions 912, 914, and 916, figure 9);

sampling the identified areas of interest at a higher spatial resolution than unidentified areas of the image (column 7, lines 15-25: sampling the image down is used to control the resolution; the lowest quality area (the background) is sampled at a lower spatial resolution than the higher quality areas of interest);

encoding the identified areas of interest at a first quality level (column 2, lines 38-39 and column 7, lines 4-8: a quality level is assigned to each of the image regions, which are subsequently encoded at said level) for transmission to a decoder in one ore more additional data streams; and

encoding the unidentified areas of the image (i.e. background area 910, figure 9) at a second and lower quality level than the identified areas (column 2, lines 39-43: lower quality level is assigned to the background, which is subsequently encoded at said lower level) for transmission to the decoder in a separate data stream from that containing the identified areas.

Regarding claims 22 and 53, Garland discloses encoding the background data stream using a lossy method (column 7, lines 63-66) and encoding the additional area of interest data stream(s) using a lossless method (column 8, lines 39-41).

Regarding claims 26 and 57, once Garland encodes the image using the method in figure 10, the compression ratio stays constant. That is, the compression ratio of the image does not change unless the image is either decompressed or further compressed.

Regarding claims 28 and 59, as established for claim 4, Garland teaches identifying areas of interest in multiple images. In order for Garland to process the separate areas of interest, there inherently must be some statistic (e.g. vertex coordinates) recorded in order to identify the location and dimensions of the areas.

Regarding claims 30 and 61, Garland's encoding method enhances certain areas (914, 916, figure 9) to artificially create additional areas of interest (in addition to the first area of interest 912).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 5, 14, 17, 18, 29, 31, 36, 45, 48, 49, 60, and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garland.

Regarding claims 5 and 36, Garland does not specifically disclose the areas of interest are identified for selected images and extrapolated for a remainder of the images. However, Garland does disclose the use of MPEG encoding, which "encodes differential information based on changes between the images in the sequence" (column 9, lines 18-20).

At the time the invention was made, object-based MPEG-4 encoding was well-known in the art. In MPEG-4, objects (areas of interest) are selected and encoded differently from unidentified areas, such as the background. In addition, conventional intra- and inter-frame encoding is carried out on the basis of motion differences. This causes some frames (intra) to be fully encoded, and the remainder (inter) to be difference encoded, or extrapolated, from the previous frames. Thus, the features of claim 5 are features of the MPEG codec, which is disclosed by Garland. Official notice taken.

Regarding claims 14 and 45, Garland teaches encoding a series of images using an MPEG codec (column 9, lines 15-23). The technique of smoothing the images so that the transitions between neighboring regions having different quantization factors exhibit gradual change is common in many MPEG codecs and would have been an obvious modification to those skilled in the art. Official notice taken.

Regarding claims 18 and 49, Garland discloses using DCT transforms rather than wavelet transforms. However, at the time the invention was made, it was well-known in the art that transforming an image into frequency coefficients using wavelets instead of DCTs presents numerous advantages, such as scalability, and to replace the DCT with the wavelet transform would have been an obvious modification to those skilled in the art. Official notice taken.

Regarding claims 17 and 48, Garland teaches quantizing the DCT coefficients for the purpose of downwardly adjusting the quality of the image in the background area (column 7, lines 26-36). Garland does not expressly disclose truncating or setting to zero one or more of the coefficients. However, sufficiently small coefficients are conventionally set to zero when quantized. In addition, zeroing out or truncating the high frequency coefficients whose magnitudes are below a threshold was a common quantizing technique at the time of the present invention. The advantages of such threshold coding were well-known to those skilled in the art. Official notice taken.

Regarding claims 29 and 60, Garland does not disclose the multiple images are from multiple sources. However, at the time of the present invention, using multiple sources (e.g. multiple cameras) to capture images of a scene was well-known in the art. Those skilled in the art would have been motivated to use multiple sources to, for example, capture stereoscopic

images, as was conventionally done in the art, the advantages of which being well-known. Offical notice taken.

Regarding claims 31 and 62, including a product or name of a product in an enhanced area is considered to be an arbitrary decision made by a user of the system and does not appear to constitute a critical aspect of the invention.

8. Claims 6, 8-10, 37, 39-41, 63, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garlnad and U.S. Patent 6,389,169 by Stark et al. ("Stark").

Regarding claims 6, 8, 37, 39, 63, and 64, Garland discloses the method/system of claims 1 and 32 as stated above.

Garland is silent to identifying the areas of interest by tracking the eye gaze point of a group of viewers, as claimed.

Stark discloses a method for processing image data based on anticipated regions of interest. In particular, Stark's method of identifying areas of interest comprises tracking human eye movements to determine those areas of an image that have the highest visual relevance. This information on the visual relevance is then used to identify areas of interest within the image (see column 7, line 61 through column 8, line 7; column 8, line 59 through column 9, line 7; and column 9, lines 36-44).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Garland by Stark to achieve the claimed invention since Stark teaches that identifying the areas of interest by tracking eye gaze movements of several viewers improves compressed image quality (column 2, lines 37-44 and column 9, lines 1-7).

Regarding claims 9 and 40, a group of viewers viewing the image inherently comprises a group of people who are (100%) likely to view the image.

Regarding claims 10 and 41, figure 8a of Stark illustrates the frequency of fixation loci 52 for different areas of the image. Figure 8a is essentially a visual histogram in that it displays locus frequencies for different image areas. Areas with a high frequency of loci are determined to be the most "popular" areas, as shown in figure 8b.

9. Claims 19 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garland and U.S. Patent 5,333,212 by Ligtenberg.

Regarding claims 19 and 50, Garland is silent to adjusting the quality level of the unidentified areas downward by pre-filtering the image with a spatially varying frequency filter.

Ligtenberg discloses a similar encoding system that compresses areas of an image, including a background area (60c, figure 2), at different quality levels. In particular, Ligtenberg discloses applying a low pass filter (70, figure 3) to the image prior to encoding in order to reduce the quality level of the image, including the unidentified background area (see column 8, "Low Pass Filtering").

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Garland by Ligtenberg to achieved the claimed invention, since Ligtenberg teaches that pre-filtering the unidentified area as claimed increases the compression ratio (column 8, lines 31-33).

10. Claims 11, 23, 24, 27, 42, 54, 55, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garland and "Lossy/Lossless Region-of-Interest Coding Based on Set Partitioning in Hierarchical Trees" by Atsumi et al. ("Atsumi").

Regarding claims 11, 23, 42, and 54, Garland is silent to identifying areas of interest during a live transmission or while in transit.

Regarding claims 24 and 55, Garland is silent to identifying the areas of interest while the image is displayed.

Atsumi discloses an image encoding method wherein transform coefficients of regions of interest can be selected while the image is being encoded and transmitted (see Abstract and section 2.2). Also, while the user is viewing the partial image during progressive reconstruction, the user identifies the areas of interest deemed to be the most important (section 2.2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Garland by Atsumi to include the claimed features of claims 11, 23, 24, 42, 54, and 55 since Atsumi teaches that, inter alia, identifying areas of interest during transmission and partial display is useful for interactive browsing (see Abstract).

Regarding claims 27 and 58, Garland teaches progressive decoding of the encoded image wherein the lowest quality areas are decoded before the higher quality areas (column 8, lines 60-67). Garland is silent to transmitting the higher quality areas first, followed by the lower quality areas.

Atsumi teaches shifting the highest priority areas of interest (ROIs) to the beginning of the bitstream so that so that the areas of higher interest are transmitted before the areas of lower interest (see section 2.1). As a result, the image is built up starting with the areas of high interest.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Garland by Atsumi to achieve the claimed invention since Atsumi teaches that transmitting and building up the highest priority areas first "enables the user to terminate transmission as soon as the ROI is reconstructed with a quality acceptable to the user, thus saving bandwidth (or time) and computational cost" (section 1, 1st paragraph).

11. Claim 25 and 56 rejected under 35 U.S.C. 103(a) as being unpatentable over Garland and U.S. Patent 6,476,873 by Maeng.

Regarding claims 25 and 56, Garland is silent to reducing the quality of the unidentified areas for security purposes.

Maeng discloses a similar encoding system, wherein regions of interest within an image are encoded at higher quality levels than the unidentified areas. In, particular, Maeng teaches that, inter alia, reducing the quality of the unidentified areas is useful for remote security systems (column 2, lines 44-52).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Garland by Maeng to achieve the claimed invention since Maeng teaches that, inter alia, reducing the quality of unidentified areas is useful for security purposes.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489. The examiner can normally be reached Monday through Thursday from 8:00 to 5:30. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (703) 306-0377.

AMELIA M. AU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

CML
Group Art Unit 2623
2 October 2003